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KOIKE SHOJI**(54) FABRIC FOR INK JET DYEING, PRETREATMENT AGENT FOR FABRIC, PRINTING AND PRINTED PRODUCT****(57) Abstract:**

**PROBLEM TO BE SOLVED:** To obtain a fabric for ink jet dyeing, capable of suppressing to the utmost a blur even if imparted with much ink, by conferring a pretreatment agent containing paraffin wax and polyethylene wax on a fabric material.

**SOLUTION:** First, a pretreatment agent of emulsion or aqueous solution type is prepared by mixing paraffin wax and polyethylene wax with each other in the weight ratio of (10:1) to (1:2) followed by incorporating the mixture with a nonionic surfactant such as polyoxyethylene alkylphenyl ether. Secondly, the pretreatment agent is applied to a fabric material so as to impart it with each 0.01-10 wt.% of the paraffin wax and polyethylene wax and 0.5-30 wt.% of the nonionic surfactant to afford a fabric for ink jet dyeing. Thirdly, an ink is conferred upon the fabric by such an ink jet system as to be controlled to delivery droplets of 5-200 pL. followed by subjecting the resultant fabric to color development treatment by e.g. a steaming technique, and then performing washing and drying, thus obtaining the corresponding printed product.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the textile-printing approach and the textile-printing object obtained by this using a suitable textile to print using an ink jet method, the pretreatment agent for textiles, and said textile.

[0002]

[Description of the Prior Art] There are an approach (JP,63-31594,B) of carrying out ink-jet dyeing at the cloth pretreated in the water solution which contains the water soluble polymer matter of non-dyeing property, water-soluble salts, and either of the water-insoluble nature inorganic particles in cloth as an approach of carrying out ink-jet record conventionally to the color to be used, the approach (JP,4-35351,B) of pretreating in the water solution which contains an alkaline substance, a urea or thiourea, and a water soluble polymer in cellulose fiber, carrying out ink-jet dyeing in the ink containing reactive dye, and carrying out dry-heat fixing processing, etc.

[0003] The places made into the purpose of these conventional technique or a prior technique are blot prevention of an image and obtaining a sharp pattern and a textile-printing object clear at high concentration. however, the depth of shade and clear nature comparable as the textile-printing object obtained by the conventional textile printing (screen printing) with these techniques -- obtaining -- it has not resulted. Since the osmosis to the thickness direction of cloth is bad, a blot when there are many homogeneity in the depth and the solid section of a color and amounts of grants of ink is a problem further again. So, the application range of a textile-printing object is narrowed.

[0004]

[Problem(s) to be Solved by the Invention] Then, its image concentration is high enough and it has the depth of a color, the purpose of this invention is excellent in the homogeneity in the solid section, and even when there are many amounts of grants of ink, it is to offer the textile-printing approach and the textile-printing object obtained by this using the textile for ink jet dyeing which can suppress generating of a blot as much as possible, the pretreatment agent for textiles, and said textile.

[0005]

[Means for Solving the Problem] The aforementioned purpose is attained by the following means.

[0006] namely, the mixing ratio of what the textile for ink jet dyeing of this invention is characterized by making a textile material contain paraffin wax and polyethylene wax, and contains polyethylene wax for paraffin wax 0.01 to 10% of the weight 0.01 to 10% of the weight at least to a textile material, said paraffin wax, and polyethylene wax -- it includes that rates are 10:1-1:2 and using the Nonion system surfactant together 0.5 to 30% of the weight further.

[0007] The pretreatment agent for textiles of this invention is characterized by containing paraffin wax and polyethylene wax in the state of an emulsion, and includes what consists of a water solution, and the thing containing the Nonion system surfactant.

[0008] moreover, the thing characterized by for the textile-printing approach of this invention giving ink to the textile of this invention with an ink jet method, washing it after coloring processing subsequently, and including the process to dry -- it is -- the mixing ratio of said paraffin wax and polyethylene wax -- it includes that rates are 10:1-1:2 and using the Nonion system surfactant together 0.5 to 30% of the weight further. Furthermore, the textile-printing object characterized by obtaining this invention by these textile-printing approaches is proposed.

[0009] In this invention, by making a textile material contain paraffin wax and polyethylene wax, textile printing by the ink jet method is performed to this textile, image concentration is high, there is depth of a color, and the textile-printing object which the homogeneity in the solid section was excellent in, and suppressed generating of a blot as much as possible even when there were many amounts of grants of ink can be obtained.

[0010]

[Embodiment of the Invention] Hereafter, this invention is explained to a detail.

[0011] The knowledge of the ability to obtain the high-concentration image which stops a color on a textile front face, raises color enhancement, is excellent in homogeneity, and has the depth of a color when this invention persons make paraffin wax and polyethylene wax use together and contain to a textile material as a result of examination wholeheartedly was carried out.

[0012] Here, it is inadequate in an engine-performance top just to have made the textile contain only paraffin wax and polyethylene wax. By using two kinds together, the unevenness of the osmosis at the time of the adhesion unevenness and ink of a wax of a face side adhering can decrease remarkably, and dispersion at the time of coloring can be suppressed as much as possible.

[0013] 0.1 - 5% of the weight of the range is more preferably good [ the content of paraffin wax ] 0.05 to 8% of the weight preferably 0.01 to 10% of the weight to a textile material. The content of polyethylene wax is 0.05 - 5% of the weight of the range more preferably 0.03 to 8% of the weight 0.01 to 10% of the weight to a textile material. If any wax has more the contents than 10 % of the weight, stability at the time of making it processing liquid can be bad, and cannot make homogeneity contain in a textile. Moreover, neither of the waxes can attain effectiveness of the improvement in image concentration as the content is less than 0.01 % of the weight.

[0014] moreover -- in order to make effectiveness of this invention more remarkable -- the mixing ratio of paraffin wax and polyethylene wax -- a rate -- 10:1-1:2 -- the range of 5:1-1:1 is preferably good.

[0015] Although especially the approach of giving paraffin wax and polyethylene wax does not choose a means, it makes paraffin wax and polyethylene wax an aqueous emulsion, and the approach of processing in the water solution (henceforth a pretreatment agent) which contains the emulsion at least etc. is mentioned. The putt dry cleaning method is an approach especially suitable although this invention is carried out especially.

[0016] The molecular weight etc. is not limited but a wide range thing can be used especially for the paraffin wax and polyethylene wax which are used by this invention. Furthermore, it is desirable to make one or more kinds of Nonion system surfactants use together in said pretreatment agent.

[0017] As a surface active agent of the Nonion system, polyoxyethylene alkyl ether, polyoxyethylene alkyl phenyl ether, polyoxyethylene fatty acid ester, a sorbitan fatty acid ester, polyoxyethylene sorbitan fatty acid ester, polyoxyethylene alkylamine, a glycerine fatty acid ester, oxyethylene oxypropylene block polymer, these permutation derivatives, etc. are mentioned, for example. Polyoxyethylene alkyl phenyl ether and especially polyoxyethylene sorbitan fatty acid ester are desirable especially. These activators are good to make it contain one to 20% of the weight preferably 0.5 to 30% of the weight to a textile.

[0018] Furthermore, in order to raise the effectiveness of the blot prevention at the time of performing ink jet dyeing, water-soluble mineral salt, a hydrotrope agent, a chelating agent, etc. can also be added.

[0019] Although which thing is sufficient as the textile used for the textile for ink jet textile printing of this invention, the textile which consists of cotton, silk, hemp, rayon, acetate, nylon, or polyester fiber, or the mixed textile which consists of two or more kinds of these fiber is used preferably, for example.

[0020] Next, the textile-printing approach of this invention of performing ink jet record on this textile is explained using the textile for ink jet textile printing of this invention of a configuration of having described above.

[0021] In the textile-printing approach of this invention, it is good to use the ink which the optimal color according to the above-mentioned various textiles contains. In this invention, reactive dye, acid dye, direct dye, a disperse dye, etc. are mentioned as a coloring material in usable ink. As a constituent of ink, what various additives, such as pH regulator, an antifungal agent, a surfactant, and water soluble resin, contain suitably is used, including at least the solvent object which consists of others, water or water, and a water-soluble organic solvent. [ colors / these ] As a water-soluble organic solvent, glycols, glycol ether, a nitrogen-containing solvent, etc. are mentioned, for example. What is necessary is for any surface active agent of the Nonion nature, anionic, cationicity, and both sexes to be usable, and just to use properly suitably [ for the purpose of these ] as a surface active agent.

[0022] In the ink containing a disperse dye, a dispersant is indispensable, and a ligninsulfonic acid salt, a naphthalene sulfonic-acid formalin condensate, polyoxyethylene alkyl phenyl ether, etc. are mentioned as the example.

[0023] Although an image is formed by the ink jet record approach by the textile-printing approach of this invention using ink which was described above on the textile for ink jet textile printing of this invention explained previously, image recording is performed by scanning an ink jet recording head on a textile, and giving ink to a desired location in that case. And coloring processing if needed is performed after ink jet record, subsequently, it washes and dries and the target textile-printing object is obtained. The approach that the heating coloring processing performed in the conventional textile-printing process is conventionally well-known can apply to coloring processing as it is. That is, the elevated-temperature steam method and a thermosol process are used.

[0024] Although which a well-known ink jet recording method is sufficient as the ink jet dyeing method used by this invention, its method which it is [ method ] the approach indicated by JP,54-59936,A, and the ink which received the operation of heat energy produces [ method ] a rapid volume change, and makes ink breathe out from a nozzle according to the applied force by this change of state for example is conventionally the most effective. As the reason, the above-mentioned method has small dispersion in the regurgitation rate of the ink between each nozzle, when using the recording head which has two or more nozzles, and it is mentioned that the regurgitation rate of ink is collected by the range of 5 - 20 m/sec. If ink collides on a textile at this rate, the condition of osmosis over the fiber of the drop at the time of \*\*\*\* is the optimal.

[0025] As ink grant conditions that the high dyeing approach of especially effectiveness is furthermore acquired by this invention, the conditions 1.5kHz or more and whose temperature of a head 2 and drive frequency are [ a discharged liquid drop ] 35-60 degrees C four to 40 nl/mm for the amount of 5 - 200pl. ink placing are desirable.

[0026] As an example of suitable equipment to dye using the ink of this invention, the heat energy corresponding to a record signal is given to the ink of the liquid room of a recording head, and although the equipment made to generate a drop from this heat energy is mentioned, it is explained below.

[0027] The example of a head configuration which is a part for the principal part of the equipment is shown in drawing 1 , drawing 2 , and drawing 3 .

[0028] A head 13 pastes up glass, ceramics or a plastic sheet etc. which has the slot 14 which lets ink pass, and the exoergic head 15 (although the head is shown by a diagram, not limited to this) used for dry heat record, and is obtained. The exoergic head 15 consists of a good substrate 20 of heat dissipation, such as the exoergic resistor layer 18 formed [ Nichrome / the protective coat 16 formed with silicon oxide etc., the aluminum electrode 17-1, 17-2, ], the accumulation layer 19, and an alumina.

[0029] Ink 21 is coming to the regurgitation orifice (micropore) 22, and forms the meniscus 23 with the pressure P.

[0030] If an electrical signal joins an electrode 17-1 and 17-2 now, \*\*\*\* shown by n of the exoergic head 15 generates heat rapidly, air bubbles will be generated in the ink 21 which has touched here, a meniscus 23 will serve as the record globule 24 from discharge and an orifice 22 by the pressure, and a projection and ink 21 will fly toward a textile 25. The external view of the multi-head which put in order many heads shown in drawing 1 is shown in drawing 3 . This multi-head sticks the same exoergic head 28 as the glass plate 27 which has the multi-slot 26, and the thing explained to drawing 1 , and is produced. In addition, drawing 1 is the sectional view of a head 13 along ink passage, and drawing 2 is a cutting plane in two to 2 line of drawing 1 .

[0031] An example of the ink jet recording device incorporating the head concerning drawing 4 is shown.

[0032] In drawing 4 , 61 is a blade as a wiping member, and the end is held by the blade attachment component, turns into the fixed end, and makes the gestalt of a cantilever. A blade 61 is held with the gestalt which it was arranged in the location contiguous to the record section by the recording head, and was projected in the moving trucking of a recording head in this example. 62 is a cap, it is arranged in the home position which adjoins a blade 61, moves in the direction perpendicular to the migration direction of a recording head, contacts a delivery side, and is equipped with the configuration which performs capping. Further 63 is an absorber which adjoins a blade 61 and is formed, and is held like a blade 61 with the gestalt projected in the moving trucking of a recording head. Removal of moisture, dust, etc. is performed to a delivery side by the above-mentioned blade 61, cap 62, and the absorber 63.

[0033] The recording head which records on the textile which counters the delivery side which 65 has a regurgitation energy generation means and allotted the delivery by breathing out ink, and 66 are the carriage for carrying a recording head 65 and moving a recording head 65. Carriage 66 engaged with the guide shaft 67 possible [ sliding ], and has connected a part of carriage 66 with the belt 69 driven by the motor 68 (un-illustrating). Thereby, carriage 66 becomes movable [ in alignment with the guide shaft 67 ], and becomes movable [ the record section by the recording head 65, and its adjoining field ].

[0034] The cloth feeding section for 51 to insert a textile and 52 are cloth delivery rollers driven by the non-illustrated motor. It \*\*\*\* to \*\*\*\*\* which arranged the \*\*\*\* roller 53 as cloth feeding of the textile is carried out by these configurations in the delivery side of a recording head, and the location which counters and record advances by them.

[0035] In case a recording head 65 returns to a home position by record termination etc. in the above-mentioned configuration, although the cap 62 of the head recovery section 64 is evacuated from the moving trucking of a recording head 65, the blade 61 is projected in moving trucking. Consequently, wiping of the delivery side of a recording head 65 is carried out. In addition, when cap 62 performs capping in contact with the delivery side of a recording head 65, cap 62 moves so that it may project in the moving trucking of a recording head.

[0036] When a recording head 65 moves to a recording start location from a home position, cap 62 and a blade 61 are in the same location as the location at the time of wiping mentioned above. Consequently, also in this

migration, wiping of the delivery side of a recording head 65 is carried out.

[0037] Migration at the home position of an above-mentioned recording head moves to the home position which adjoined the record section at the predetermined spacing, not only the time of record termination and delivery recovery but while moving in the record section for record of a recording head, and the above-mentioned wiping is performed with this migration.

[0038] Drawing 5 is drawing showing an example of the ink cartridge which held the ink supplied through the ink feed zone material of a head, for example, a tube. Here, 40 is the ink hold section which held the ink for supply, for example, an ink bag, and the plug 42 made of rubber is formed at the tip. By inserting a needle (un-illustrating) in this plug 42, the ink in the ink bag 40 is closed, if supply on a head is possible. 44 is an absorber which receives waste ink. As the ink hold section, that in which the liquid-facing surface with ink is formed with polyolefine, especially polyethylene is desirable. although shown not only in that from which the head and in KUKATO ridge like the above became another object but in drawing 6 as an ink jet recording apparatus used by this invention -- \*\*\*\* -- it is used suitable also for that with which they were united.

[0039] In drawing 6, 70 is a record unit, the ink hold section which held ink into this, for example, an ink absorber, is contained, and the ink in this ink absorber has composition breathed out as an ink droplet from the head section 71 which has two or more orifices. 72 is atmospheric-air free passage opening for making atmospheric air open the interior of a record unit for free passage. This record unit 70 is changed and used for the recording head shown by drawing 4, and is removable to carriage 66.

[0040]

[Example] Hereafter, although an example and the example of a comparison explain this invention still more concretely, this invention is not limited to these. In addition, unless it refuses especially, the "section" calls "% of the weight" "%" for the "weight section." The evaluation result was summarized in Table 1.

Production of the aquosity emulsion of example 1 paraffin wax: The two sections and polyoxyethylene sorbitan palmitic-acid ester were emulsified by the one section, the 67 sections were emulsified [ the 30 sections and the polyoxyethylene cetyl ether ] for water with the conventional method, and paraffin wax (molecular weight 300-600) was made into the aquosity emulsion of paraffin wax.

[0041] Production of the aquosity emulsion of polyethylene wax: The two sections and polyoxyethylene sorbitan palmitic-acid ester were emulsified by the one section, the 67 sections were emulsified [ the 30 sections and the polyoxyethylene cetyl ether ] for water with the conventional method, and polyethylene wax (molecular weight 2000-3000) was made into the aquosity emulsion of polyethylene wax.

[0042] Stirring mixing of the aquosity emulsion of the above-mentioned paraffin wax was carried out for 3 hours in the condition of having mixed the 15 sections and bicarbonate od soda for the 2.0 sections and polyoxyethylene (n= 25) stearyl ether, having mixed [ the 3.0 sections and the aquosity emulsion of polyethylene wax ] the 75.0 sections for the 5.0 sections and water, and having warmed at 50 degrees C, and the solution-like pretreatment agent was obtained. The cheesecloth of a plain weave was infiltrated (contraction percentage: 100%), this pretreatment agent was dried, and the textile for ink jet textile printing of this example was obtained. In addition, the contraction percentage (%) was searched for by the following formula.

[0043] The textile obtained by the contraction percentage (%) = [(grant weight of pretreatment agent)/(weight of cloth)] x100 above was started in the magnitude of the A4 version, and the full color print was performed using the ink of the presentation shown below using the commercial ink-jet color printer (820 Canon BJC- trade name). Moreover, respectively, after four sorts of ink adjusted each component to pH=7.0 by the sodium hydroxide after mixed stirring, with the FURORO pore filter, it filtered and it was used.

[0044]

Yellow ink - The C.I. reactive yellow 95 The eight sections - Thiodiglycol The 20 sections - A diethylene glycol The 15 sections - Ion exchange water The 57 sections Magenta ink - The C.I. reactive red 226 The eight sections - Thiodiglycol The 20 sections - The diethylene-glycol 10 section - Ion exchange water The 62 sections Cyanogen ink - C.I. reactive blue 15 The ten sections - Thiodiglycol The 20 sections - A diethylene glycol 15 sections and ion exchange water The 55 sections Black ink - The C.I. reactive black 39 The 11 section The - thiodiglycol 20 section - diethylene glycol The 15 sections - ion exchange water After 54 section print termination, immediately, at 102 degrees C, steam processing was performed for 8 minutes, and, subsequently it rinsed and dried. Consequently, on the obtained cheesecloth, the color picture of deep sufficient concentration was printed skillfully. Moreover, there is also no image nonuniformity and the sharp image was obtained. Stirring mixing of the aquosity emulsion of paraffin wax given in example 2 example 1 was carried out for 3 hours in the condition of having mixed the 15.0 sections and bicarbonate od soda for the 0.02 sections and polyoxyethylene (n= 25) stearyl ether, having mixed [ the 0.04 sections and the aquosity emulsion of polyethylene wax ] the 79.94 sections for the 5.0 sections and water, and having warmed at 50 degrees C, and the solution-like pretreatment agent was obtained. The cheesecloth of a plain weave was infiltrated (contraction

percentage: 100%), this pretreatment agent was dried, and the textile for ink jet textile printing of this example was obtained.

[0045] The textile obtained above was started in the magnitude of the A4 version, and the full color print was performed using the ink of the presentation shown in an example 1 using the commercial ink-jet color printer (620 Canon BJC- trade name).

[0046] After print termination, immediately, at 102 degrees C, steam processing was performed for 8 minutes, and, subsequently it rinsed and dried. Consequently, on the obtained cheesecloth, the color picture of deep sufficient concentration was printed skillfully. Moreover, there is also no image nonuniformity and the sharp image was obtained.

Stirring mixing of the aquosity emulsion of paraffin wax given in example 3 example 1 was carried out for 3 hours in the condition of having mixed the 15.0 sections and bicarbonate od soda for the 25.0 sections and the polyoxyethylene (n= 50) cetyl ether, having mixed [ the 32.0 sections and the aquosity emulsion of polyethylene wax ] the 23.0 sections for the 5.0 sections and water, and having warmed at 50 degrees C, and the solution-like pretreatment agent was obtained. Silk was infiltrated (contraction percentage: 100%), this pretreatment agent was dried, and the textile for ink jet textile printing of this example was obtained.

[0047] The textile obtained above was started in the magnitude of the A4 version, and the full color print was performed using the ink of the presentation shown in an example 1 using the commercial ink-jet color printer (600 Canon BJC- trade name).

[0048] After print termination, immediately, at 102 degrees C, steam processing was performed for 8 minutes, and, subsequently it rinsed and dried. Consequently, on the obtained silk, the color picture of deep sufficient concentration was printed skillfully. Moreover, there is also no image nonuniformity and the sharp image was obtained.

Stirring mixing of the aquosity emulsion of paraffin wax given in example 4 example 1 was carried out for 3 hours in the condition of having mixed the 12.0 sections and bicarbonate od soda for the 0.5 sections and polyoxyethylene (n= 25) stearyl ether, having mixed [ the 2.5 sections and the aquosity emulsion of polyethylene wax ] the 80.0 sections for the 5.0 sections and water, and having warmed at 50 degrees C, and the solution-like pretreatment agent was obtained. The cheesecloth of a plain weave was infiltrated (contraction percentage: 100%), this pretreatment agent was dried, and the textile for ink jet textile printing of this example was obtained.

[0049] The textile obtained above was started in the magnitude of the A4 version, and the full color print was performed using the ink of the presentation shown in an example 1 using the commercial ink-jet color printer (600 Canon BJC- trade name).

[0050] After print termination, immediately, at 102 degrees C, steam processing was performed for 8 minutes, and, subsequently it rinsed and dried. Consequently, on the obtained cheesecloth, the color picture of deep sufficient concentration was printed skillfully. Moreover, there is also no image nonuniformity and the sharp image was obtained.

Stirring mixing of the aquosity emulsion of paraffin wax given in example 5 example 1 was carried out for 3 hours in the condition of having mixed the 5.0 sections and bicarbonate od soda for the 2.0 sections and the polyoxyethylene (n= 50) cetyl ether, having mixed [ the 1.0 sections and the aquosity emulsion of polyethylene wax ] the 87.0 sections for the 5.0 sections and water, and having warmed at 50 degrees C, and the solution-like pretreatment agent was obtained. Silk was infiltrated (contraction percentage: 100%), this pretreatment agent was dried, and the textile for ink jet textile printing of this example was obtained.

[0051] The textile obtained above was started in the magnitude of the A4 version, and the full color print was performed using the ink of the presentation shown in an example 1 using the commercial ink-jet color printer (420 Canon BJC- trade name).

[0052] After print termination, immediately, at 102 degrees C, steam processing was performed for 8 minutes, and, subsequently it rinsed and dried. Consequently, on the obtained silk, the color picture of deep sufficient concentration was printed skillfully. Moreover, there is also no image nonuniformity and the sharp image was obtained.

Stirring mixing of the aquosity emulsion of paraffin wax given in example 6 example 1 was carried out for 3 hours in the condition of having mixed the 1.0 sections and bicarbonate od soda for the 2.0 sections and polyoxyethylene (n= 50) stearyl ether, having mixed [ the 3.0 sections and the aquosity emulsion of polyethylene wax ] the 89.0 sections for the 5.0 sections and water, and having warmed at 50 degrees C, and the solution-like pretreatment agent was obtained. Silk was infiltrated (contraction percentage: 100%), this pretreatment agent was dried, and the textile for ink jet textile printing of this example was obtained.

[0053] The textile obtained above was started in the magnitude of the A4 version, and the full color print was performed using the ink of the presentation shown in an example 1 using the commercial ink-jet color printer (820 Canon BJC- trade name).

[0054] After print termination, immediately, at 102 degrees C, steam processing was performed for 8 minutes, and, subsequently it rinsed and dried. Consequently, on the obtained silk, the color picture of deep sufficient concentration was printed skillfully. Moreover, there is also no image nonuniformity and the sharp image was obtained.

Stirring mixing of the aquosity emulsion of paraffin wax given in example 7 example 1 was carried out for 3 hours in the condition of having mixed the 18.0 sections and bicarbonate of soda for the 2.0 sections and the polyoxyethylene (n= 20) cetyl ether, having mixed [ the 3.0 sections and the aquosity emulsion of polyethylene wax ] the 72.0 sections for the 5.0 sections and water, and having warmed at 50 degrees C, and the solution-like pretreatment agent was obtained. The cheesecloth of a plain weave was infiltrated (contraction percentage: 100%), this pretreatment agent was dried, and the textile for ink jet textile printing of this example was obtained.

[0055] The textile obtained above was started in the magnitude of the A4 version, and the full color print was performed using the ink of the presentation shown in an example 1 using the commercial ink-jet color printer (820 Canon BJC- trade name).

[0056] After print termination, immediately, at 102 degrees C, steam processing was performed for 8 minutes, and, subsequently it rinsed and dried. Consequently, on the obtained cheesecloth, the color picture of deep sufficient concentration was printed skillfully. Moreover, there is also no image nonuniformity and the sharp image was obtained.

The cheesecloth for a comparison was adjusted like the example 1 except not using the aquosity emulsion of example of comparison 1 paraffin wax, and the aquosity emulsion of polyethylene wax.

[0057] The commercial ink-jet color printer (820 Canon BJC- trade name) was used for this textile, and the full color print was performed to it using the ink of the presentation shown in an example 1. After print termination, it processed like the example 1 and the textile-printing object was obtained.

[0058] Consequently, although the color picture with few blots was obtained on the obtained cheesecloth, it was not the color picture of sufficient concentration which is not clear compared with an example and is deep. The cheesecloth for a comparison was adjusted like the example 1 except not using the aquosity emulsion of example of comparison 2 paraffin wax.

[0059] The commercial ink-jet color printer (820 Canon BJC- trade name) was used for this textile, and the full color print was performed to it using the ink of the presentation shown in an example 1. After print termination, it processed like the example 1 and the textile-printing object was obtained. Consequently, although the color picture of a comparatively skillful color tone with few blots was obtained on the obtained cheesecloth, nonuniformity was looked at by especially the solid section not compared with the color picture of deep sufficient concentration but compared with the example.

The cheesecloth for a comparison was adjusted like the example 1 except not using the aquosity emulsion of example of comparison 3 polyethylene wax.

[0060] The commercial ink-jet color printer (820 Canon BJC- trade name) was used for this textile, and the full color print was performed to it using the ink of the presentation shown in an example 1. After print termination, it processed like the example 1 and the textile-printing object was obtained. Consequently, although the color picture of a comparatively skillful color tone with few blots was obtained on the obtained cheesecloth, nonuniformity was looked at by especially the solid section not compared with the color picture of deep sufficient concentration but compared with the example.

The cheesecloth for a comparison was adjusted like the example 1 except having used [ the aquosity emulsion of example of comparison 4 paraffin WA@KKUSU ] the 35.0 sections for the 20.0 sections and the aquosity emulsion of polyethylene wax. However, the homogeneity of processing liquid was bad, processed and ran away.

[0061] The commercial ink-jet color printer (820 Canon BJC- trade name) was used for this textile, and the full color print was performed to it using the ink of the presentation shown in an example 1. After print termination, it processed like the example 1 and the textile-printing object was obtained. Consequently, although concentration and a color picture good in depth were obtained on the obtained cheesecloth, compared with the example, nonuniformity was looked at by the solid section and it became the image which is not sharp.

The cheesecloth for a comparison was adjusted like the example 1 except having used [ the aquosity emulsion of example of comparison 5 paraffin WA@KKUSU ] the 10.0 sections for the 35.0 sections and the aquosity emulsion of polyethylene wax. However, the homogeneity of processing liquid was bad, processed and ran away.

[0062] The commercial ink-jet color printer (820 Canon BJC- trade name) was used for this textile, and the full color print was performed to it using the ink of the presentation shown in an example 1. After print termination, it processed like the example 1 and the textile-printing object was obtained. Consequently, although concentration and a color picture good in depth were obtained on the obtained cheesecloth, compared with the example,



nonuniformity was looked at by the solid section and it became the image which is not sharp.

[0063] The evaluation result of the above example and the example of a comparison was summarized in Table 1.

[0064]

[Table 1]

		画像濃度	シャープ度	画像ムラ (ベタ部)
実施例	1	◎	◎	◎
	2	○	◎	○
	3	◎	○	◎
	4	◎	◎	◎
	5	◎	◎	◎
	6	◎	○	◎
	7	◎	◎	◎
比較例	1	×	○	△
	2	○	○	△～×
	3	○	○	×
	4	○	△	×
	5	○	△	×

(註) ◎ : 特に良好 ○ : 良好 △ : 問題あり × : 不可

[0065]

[Effect of the Invention] As explained above, when an image is formed on the textile which consists of various fiber using an ink jet recording device according to this invention, it is clear, and is deep and it becomes possible to form a high-concentration image without nonuniformity.

[0066] Moreover, according to this invention, also with the usual ink jet printer marketed as the object for office, or an object for personal, it is deep and the textile-printing object with which coloring concentration consists of various clear high and fiber can be obtained easily.

[Translation done.]



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CLAIMS

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[Claim(s)]

[Claim 1] The textile for ink jet dyeing characterized by making a textile material contain paraffin wax and polyethylene wax.

[Claim 2] The textile for ink jet dyeing according to claim 1 which contains polyethylene wax for paraffin wax 0.01 to 10% of the weight 0.01 to 10% of the weight at least to a textile material.

[Claim 3] The textile for ink jet dyeing according to claim 2 whose mixed ratios of said paraffin wax and polyethylene wax are 10:1-1:2.

[Claim 4] The textile for ink jet dyeing according to claim 2 or 3 which uses together the Nonion system surface active agent 0.5 to 30% of the weight.

[Claim 5] The pretreatment agent for textiles characterized by containing paraffin wax and polyethylene wax in the state of an emulsion.

[Claim 6] Said pretreatment agent is a pretreatment agent for textiles according to claim 5 which consists of a water solution.

[Claim 7] The pretreatment agent for textiles containing the Nonion system surfactant according to claim 5.

[Claim 8] The textile-printing approach which gives ink to the textile for ink jet dyeing according to claim 1 with an ink jet method, and is subsequently characterized by including the process washed and dried after coloring processing.

[Claim 9] The textile-printing approach according to claim 8 using steam as said coloring processing.

[Claim 10] The textile-printing approach according to claim 8 which controls the discharged liquid drop of ink to 5 - 200pl. on the occasion of said ink grant.

[Claim 11] The textile-printing object characterized by being obtained by the approach given in claim 8 thru/or any 1 term of 10.

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[Translation done.]

## \* NOTICES \*

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DESCRIPTION OF DRAWINGS

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## [Brief Description of the Drawings]

[Drawing 1] It is a typical sectional view along ink passage to show the example of a configuration of the ink jet head used by this invention.

[Drawing 2] The cutting plane in two to 2 line of drawing 1 is shown.

[Drawing 3] It is the \*\* type external view of the multi-head which put in order many heads shown in drawing 1.

[Drawing 4] It is the perspective view showing an example incorporating an ink jet head of the ink jet recording device used by this invention.

[Drawing 5] It is the sectional view showing an example of the ink cartridge which held the ink supplied to an ink jet head.

[Drawing 6] It is the perspective view showing an example of the ink jet recording device with which the head and the ink cartridge are united.

## [Description of Notations]

13 Head

14 Slot

15 28 Exoergic head

16 Protective Coat

17-1, 17-2 Aluminum electrode

18 Exoergic Resistor Layer

19 Accumulation Layer

20 Substrate

21 Ink

22 Regurgitation Orifice

23 Meniscus

24 Record Globule

25 Textile

26 Multi-Slot

27 Glass Plate

40 Ink Bag

42 Plug

44 63 Absorber

51 Cloth Feeding Section

52 Cloth Delivery Roller

53 \*\*\*\* Roller

61 Blade

62 Cap

64 Recovery Section

65 Recording Head

66 Carriage

67 Guide Shaft

68 Motor

69 Belt

70 Record Unit

71 Head Section

72 Atmospheric-Air Free Passage Opening

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[Translation done.]

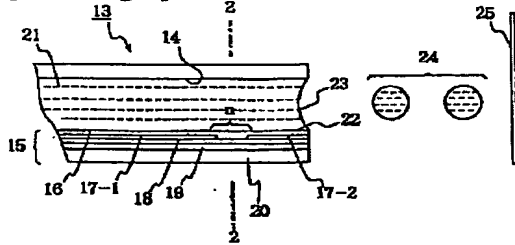
## \* NOTICES \*

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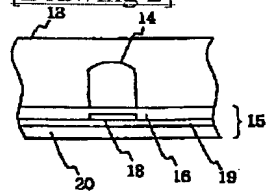
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3. In the drawings, any words are not translated.

## DRAWINGS

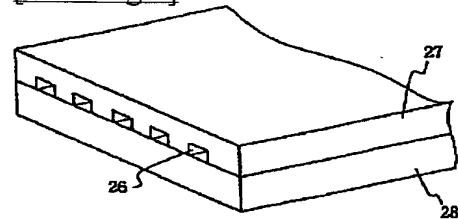
[Drawing 1]



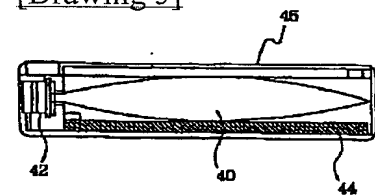
[Drawing 2]



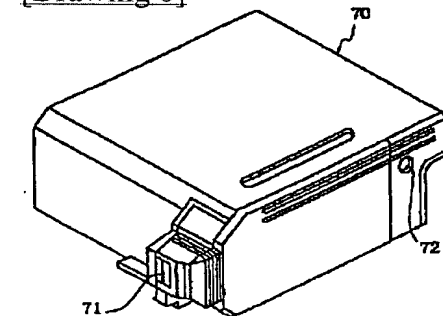
[Drawing 3]



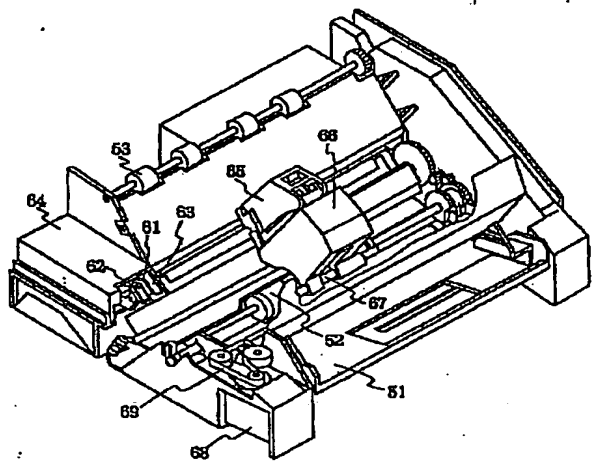
[Drawing 5]



[Drawing 6]



[Drawing 4]



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[Translation done.]

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CORRECTION OR AMENDMENT

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 [Section partition] The 5th partition of the 3rd section  
 [Publication date] March 13, Heisei 13 (2001. 3.13)

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 [Application number] Japanese Patent Application No. 10-45529  
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 112  
 B41J 2/01

[FI]

D06P 5/00 111 A  
 112  
 B41J 3/04 101 Z

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 [Filing Date] March 7, Heisei 12 (2000. 3.7)  
 [Procedure amendment 1]  
 [Document to be Amended] Specification  
 [Item(s) to be Amended] The name of invention  
 [Method of Amendment] Modification  
 [Proposed Amendment]  
 [Title of the Invention] How to raise the manufacture approach of the pretreatment agent for the textile for ink jet dyeing, and textiles, the textile-printing approach, a textile-printing object, and a textile, and the grace of a textile-printing object  
 [Procedure amendment 2]  
 [Document to be Amended] Specification  
 [Item(s) to be Amended] Claim  
 [Method of Amendment] Modification  
 [Proposed Amendment]  
 [Claim(s)]  
 [Claim 1] The textile for ink jet dyeing characterized by containing 10 % of the weight for paraffin wax and polyethylene wax as an upper limit to this textile material for a textile material, respectively.  
 [Claim 2] The textile for ink jet dyeing according to claim 1 which contains polyethylene wax for paraffin wax 0.01 to 10% of the weight 0.01 to 10% of the weight at least to a textile material.  
 [Claim 3] The textile for ink jet dyeing according to claim 2 whose mixed ratios of said paraffin wax and polyethylene wax are 10:1-1:2.  
 [Claim 4] The textile for ink jet dyeing according to claim 2 or 3 which uses together the Nonion system surface active agent 0.5 to 30% of the weight.  
 [Claim 5] The textile for ink jet dyeing given in any 1 term of claims 1-4 which paraffin wax and polyethylene wax contain in this textile according to sinking in.  
 [Claim 6] The pretreatment agent for textiles characterized by containing paraffin wax and polyethylene wax in

the state of an emulsion.

[Claim 7] Said pretreatment agent is a pretreatment agent for textiles according to claim 6 which consists of a water solution.

[Claim 8] The pretreatment agent for textiles containing the Nonion system surfactant according to claim 6.

[Claim 9] The pretreatment agent for textiles given in any 1 term of claims 6-8 which are the pretreatment agents of the textile which this pretreatment agent for textiles uses for ink jet dyeing.

[Claim 10] The textile-printing approach which gives ink to the textile for ink jet dyeing according to claim 1 with an ink jet method, and is subsequently characterized by including the process washed and dried after coloring processing.

[Claim 11] The textile-printing approach according to claim 10 using steam as said coloring processing.

[Claim 12] The textile-printing approach according to claim 11 which controls the discharged liquid drop of ink to 5 - 200pl. on the occasion of said ink grant.

[Claim 13] The textile-printing object characterized by being obtained by the approach given in claim 10 thru/or any 1 term of 12.

[Claim 14] The manufacture approach of the textile for ink jet dyeing characterized by including the process which makes a textile contain paraffin wax and polyethylene wax by making 10 % of the weight into an upper limit to a textile material according to sinking in, respectively.

[Claim 15] How to be the approach of raising the grace of the textile-printing object obtained by performing washing and desiccation after coloring processing, and raise [ uses an ink jet printer for a textile and gives ink, and ] the grace of the textile-printing object characterized by including the head end process which makes this textile contain 10 % of the weight for paraffin wax and polyethylene wax as an upper limit to a textile material, respectively.

[Procedure amendment 3]

[Document to be Amended] Specification

[Item(s) to be Amended] 0001

[Method of Amendment] Modification

[Proposed Amendment]

[0001]

[Field of the Invention] This invention relates to the approach of raising the manufacture approach of a suitable textile to print using an ink jet method, the pretreatment agent for textiles, the textile-printing approach using said textile, the textile-printing object obtained by this, and said textile, and the grace of a textile-printing object acquired.

[Procedure amendment 4]

[Document to be Amended] Specification

[Item(s) to be Amended] 0004

[Method of Amendment] Modification

[Proposed Amendment]

[0004]

[Problem(s) to be Solved by the Invention] Then, its image concentration is high enough and it has the depth of a color, the purpose of this invention is excellent in the homogeneity in the solid section, and even when there are many amounts of grants of ink, it is to offer the approach of raise the manufacture approach of the textile for ink-jet dyeing which can suppress generating of a blot as much as possible, the pretreatment agent for textiles, the textile-printing approach using said textile, the textile-printing object obtain by this, and said textile, and the grace of a textile-printing object acquire. <BR> [Procedure amendment 5]

[Document to be Amended] Specification

[Item(s) to be Amended] 0006

[Method of Amendment] Modification

[Proposed Amendment]

[0006] Namely, the textile for ink jet dyeing of this invention It is what is characterized by making a textile material contain 10 % of the weight for paraffin wax and polyethylene wax as an upper limit to this textile material, respectively. As opposed to a textile material at least paraffin wax 0.01 - 10 % of the weight, The mixed ratios of what contains polyethylene wax 0.01 to 10% of the weight, said paraffin wax, and polyethylene wax are 10:1-1:2, It includes further using the Nonion system surfactant together 0.5 to 30% of the weight, and that paraffin wax and polyethylene wax contain in this textile according to sinking in.

[Procedure amendment 6]

[Document to be Amended] Specification

[Item(s) to be Amended] 0007

[Method of Amendment] Modification



[Proposed Amendment]

[0007] The pretreatment agent for textiles of this invention is characterized by containing paraffin wax and polyethylene wax in the state of an emulsion, and what consists of a water solution, the thing containing the Nonion system surface active agent, and the thing which is the pretreatment agent of the textile which this pretreatment agent uses for ink jet dyeing further are included.

[Procedure amendment 7]

[Document to be Amended] Specification

[Item(s) to be Amended] 0008

[Method of Amendment] Modification

[Proposed Amendment]

[0008] Moreover, the textile-printing approach of this invention includes controlling the discharged liquid drop of ink to 5-200pl on the occasion of it being characterized by including the process which gives ink with an ink jet method, subsequently washes after coloring processing, and is dried, and using steam for the textile of this invention as this coloring processing, and this ink grant. Furthermore, the textile-printing object characterized by obtaining this invention by these textile-printing approaches is proposed. Furthermore, the manufacture approach of the textile for ink jet dyeing characterized by this invention including the process which makes a textile contain paraffin wax and polyethylene wax by making 10 % of the weight into an upper limit to a textile material according to sinking in, respectively is proposed. Furthermore, this invention uses an ink jet printer for a textile, and gives ink, it is the approach of raising the grace of the textile-printing object obtained by performing washing and desiccation after coloring processing, and the approach of raising the grace of the textile-printing object characterized by including the head end process which makes this textile contain 10 % of the weight for paraffin wax and polyethylene wax as an upper limit to a textile material, respectively is proposed.

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[Translation done.]

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B 4 1 J 2/01		B 4 1 J 3/04 1 0 1 Z

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(54) 【発明の名称】 インクジェット染色用布帛、布帛用前処理剤、捺染方法及び捺染物

(57) 【要約】

【課題】 画像濃度が高く、色の深みがあり、ベタ部での均一性に優れ、画像ムラのない、シャープなインクジェット捺染用布帛、捺染方法及び捺染物の提供。

【解決手段】 布帛素材に対して少なくとも、パラフィンワックスを0.01～10重量%、ポリエチレンワックスを0.01～10重量%含有するインクジェット染色用布帛、該布帛にインクジェット方式により捺染を行う方法、及び該方法により捺染物を得る。

**【特許請求の範囲】**

【請求項1】 布帛素材に、パラフィンワックス及びポリエチレンワックスを含有させたことを特徴とするインクジェット染色用布帛。

【請求項2】 布帛素材に対して少なくとも、パラフィンワックスを0.01～10重量%、ポリエチレンワックスを0.01～10重量%含有する請求項1に記載のインクジェット染色用布帛。

【請求項3】 前記パラフィンワックスとポリエチレンワックスの混合比率が10:1～1:2である請求項2に記載のインクジェット染色用布帛。

【請求項4】 ノニオン系界面活性剤を0.5～30重量%併用する請求項2または3に記載のインクジェット染色用布帛。

【請求項5】 エマルジョン状態でパラフィンワックス及びポリエチレンワックスを含有することを特徴とする布帛用前処理剤。

【請求項6】 前記前処理剤は水溶液からなる請求項5に記載の布帛用前処理剤。

【請求項7】 ノニオン系界面活性剤を含有する請求項5に記載の布帛用前処理剤。

【請求項8】 請求項1に記載のインクジェット染色用布帛に、インクジェット方式によりインクを付与し、次いで発色処理後、洗浄し乾燥する工程を含むことを特徴とする捺染方法。

【請求項9】 前記発色処理としてスチームを用いる請求項8に記載の捺染方法。

【請求項10】 前記インク付与に際し、インクの吐出液滴を5～200p.l.に制御する請求項8に記載の捺染方法。

【請求項11】 請求項8ないし10のいずれか1項に記載の方法により得られたことを特徴とする捺染物。

**【発明の詳細な説明】****【0001】**

【発明の属する技術分野】本発明は、インクジェット方式を用いてプリントするのに好適な布帛、布帛用前処理剤、前記布帛を用いた捺染方法及びこれにより得られた捺染物に関する。

**【0002】**

【従来の技術】従来、布にインクジェット記録する方法として、用いる染料に対して非染色性の水溶性高分子物質と、水溶性塩類と、水不溶性無機微粒子のいずれかを含有水溶液で前処理された布に、インクジェット染色する方法（特公昭63-31594号公報）や、セルロース繊維にアルカリ性物質と尿素またはチオ尿素と水溶性高分子を含む水溶液で前処理し、反応染料を含むインクでインクジェット染色し、乾熱固着処理する方法（特公平4-35351号公報）等がある。

【0003】これら従来技術や先願技術の目的とするところは、画像の滲み防止と、シャープな絵柄、及び高濃

度で鮮明な捺染物を得ることである。しかしながら、これらの技術では、従来の捺染法（スクリーン捺染）で得られた捺染物と同程度の色濃度と鮮明性を得るは至っていない。さらにまた、布の厚さ方向に対する浸透が悪いために、色の深みやベタ部での均一性、インクの付与量が多い場合の滲みが問題である。それゆえ、捺染物への応用範囲が狭められている。

**【0004】**

【発明が解決しようとする課題】そこで本発明の目的は、画像濃度が十分高く、色の深みがあり、ベタ部での均一性が優れ、インクの付与量が多い場合でも滲みの発生を極力抑えることができるインクジェット染色用布帛、布帛用前処理剤、前記布帛を用いた捺染方法及びこれにより得られる捺染物を提供することにある。

**【0005】**

【課題を解決するための手段】前記の目的は以下の手段によって達成される。

【0006】すなわち、本発明のインクジェット染色用布帛は、布帛素材に、パラフィンワックス及びポリエチレンワックスを含有させたことを特徴とするもので、布帛素材に対して少なくとも、パラフィンワックスを0.01～10重量%、ポリエチレンワックスを0.01～10重量%含有するもの、前記パラフィンワックスとポリエチレンワックスの混合比率が10:1～1:2であること、さらに、ノニオン系界面活性剤を0.5～30重量%併用することを含む。

【0007】本発明の布帛用前処理剤は、エマルジョン状態でパラフィンワックス及びポリエチレンワックスを含有することを特徴とするものであり、水溶液からなるもの、ノニオン系界面活性剤を含有するものを包含する。

【0008】また、本発明の捺染方法は、本発明の布帛に、インクジェット方式によりインクを付与し、次いで発色処理後、洗浄し、乾燥する工程を含むことを特徴とするものであり、前記パラフィンワックスとポリエチレンワックスの混合比率が10:1～1:2であること、さらに、ノニオン系界面活性剤を0.5～30重量%併用することを含む。さらに本発明はこれらの捺染方法により得られたことを特徴とする捺染物を提案するものである。

【0009】本発明においては、布帛素材にパラフィンワックスとポリエチレンワックスとを含有させることにより、この布帛にインクジェット方式による捺染を行って、画像濃度が高く、色の深みがあり、ベタ部での均一性が優れ、かつインクの付与量が多い場合でも滲みの発生を極力抑えた捺染物を得ることができる。

**【0010】**

【発明の実施の形態】以下、本発明を詳細に説明する。

【0011】本発明者らは鋭意検討の結果、布帛素材に対しパラフィンワックスとポリエチレンワックスを併用

して含有させると、布帛表面に染料を留めて発色性を向上させ、均一性に優れ、色の深みのある高濃度の画像を得られることを知見した。

【0012】ここで、パラフィンワックスのみや、ポリエチレンワックスのみを布帛に含有させただけでは性能上不十分である。2種類を併用することにより、布表面のワックスの付着むらとインクが付着する際の浸透のむらが著しく減少し、発色時のぼらつきを極力抑えることができる。

【0013】パラフィンワックスの含有量は、布帛素材に対して、0.01～10重量%、好ましくは0.05～8重量%、より好ましくは0.1～5重量%の範囲がよい。ポリエチレンワックスの含有量は、布帛素材に対して、0.01～10重量%、好ましくは0.03～8重量%、より好ましくは0.05～5重量%の範囲である。いずれのワックスもその含有量が10重量%より多いと、処理液にした場合の安定性が悪く、均一に布帛に含有させることができない。また、いずれのワックスもその含有量が0.01重量%未満であると、画像濃度向上の効果が達成できない。

【0014】また、本発明の効果をより顕著にするためには、パラフィンワックスとポリエチレンワックスの混合比率は10:1～1:2、好ましくは5:1～1:1の範囲がよい。

【0015】パラフィンワックスとポリエチレンワックスを付与する方法は、特に手段を選ばないがパラフィンワックスとポリエチレンワックスを水性エマルジョンにし、少なくともそのエマルジョンを含有する水溶液（以下前処理剤という）で処理する方法等が挙げられる。中でもパットドライ法が本発明を実施するのに特にふさわしい方法である。

【0016】本発明で使用するパラフィンワックスとポリエチレンワックスは、その分子量等特に限定されず、広範囲のものを使用できる。さらに、ノニオン系界面活性剤を前記前処理剤中に1種類以上併用させることが好ましい。

【0017】ノニオン系の界面活性剤としては、例えば、ポリオキシエチレンアルキルエーテル、ポリオキシエチレンアルキルフェニルエーテル、ポリオキシエチレン脂肪酸エステル、ソルビタン脂肪酸エステル、ポリオキシエチレンソルビタン脂肪酸エステル、ポリオキシエチレンアルキルアミン、グリセリン脂肪酸エステル、オキシエチレンオキシプロピレンブロックポリマー、及びこれらの置換誘導体等が挙げられる。中でもポリオキシエチレンアルキルフェニルエーテル、ポリオキシエチレンソルビタン脂肪酸エステルが特に好ましい。これらの活性剤は、布帛に対して、0.5～30重量%、好ましくは、1～20重量%含有させるとよい。

【0018】またさらに、インクジェット染色を行った場合の滲み防止の効果を向上させるために、水溶性無機

塩やヒドロロブ剤、キレート剤等を添加することもできる。

【0019】本発明のインクジェット捺染用布帛に用いられる布帛はいずれのものでもよいが、例えば、綿、絹、麻、レーヨン、アセテート、ナイロンもしくはポリエステル繊維からなる布帛、またはこれらの繊維の2種類以上からなる混紡布帛が好ましく用いられる。

【0020】次に、上記した構成の本発明のインクジェット捺染用布帛を用い、該布帛上にインクジェット記録を行う本発明の捺染方法について説明する。

【0021】本発明の捺染方法においては、上記した種々の布帛に応じた最適な染料が含有されているインクを用いるとよい。本発明において使用可能なインク中の色剤としては、反応染料・酸性染料・直接染料・分散染料等が挙げられる。インクの構成成分としては、これらの染料の他、水、あるいは水と水溶性有機溶剤とからなる液媒体を少なくとも含み、その他、pH調整剤、防黴剤、界面活性剤、水溶性樹脂等の各種添加剤が適宜含有されているものが用いられる。水溶性有機溶剤としては、例えば、グリコール類、グリコールエーテル類、含窒素溶剤等が挙げられる。界面活性剤としては、ノニオン性、アニオン性、カチオン性、両性のいずれの界面活性剤も使用可能であり、これらを目的に応じて適宜に使い分けられよい。

【0022】分散染料を含むインクには分散剤が必須であり、その具体例としては、リグニンスルホン酸塩、ナフタレンスルホン酸ホルマリン縮合物や、ポリオキシエチレンアルキルフェニルエーテル等が挙げられる。

【0023】本発明の捺染方法では、先に説明した本発明のインクジェット捺染用布帛上に、上記したようなインクを用いてインクジェット記録方法により画像を形成するが、その際、インクジェット記録ヘッドを布帛上で走査してインクを所望の位置に付与することによって画像記録を行う。そして、インクジェット記録後、必要に応じた発色処理を行い、次いで、洗浄及び乾燥して目的の捺染物を得る。発色処理には、従来の捺染プロセスにおいて行われる加熱発色処理等の従来公知の方法がそのまま適用できる。すなわち、高温スチーム法やサーモゾル法が用いられる。

【0024】本発明で使用するインクジェット染色方式は、従来公知のいずれのインクジェット記録方式でもよいが、例えば、特開昭54-59936号公報に記載されている方法で、熱エネルギーの作用を受けたインクが急激な体積変化を生じ、この状態変化による作用力によって、インクをノズルから吐出させる方式が最も有効である。その理由としては、上記方式は複数のノズルを有する記録ヘッドを用いる場合、各ノズル間のインクの吐出速度のぼらつきが小さく、インクの吐出速度が5～20m/sec.の範囲に集約されていることが挙げられる。この速度でインクが布帛上に衝突すると、着滴時の

液滴の繊維に対する浸透の具合が最適である。

【0025】さらに本発明で特に効果の高い染色方法が得られるインク付与条件としては、吐出液滴が5～200 $\mu$ l、インク打ち込み量が4～40 $\text{nl}/\text{mm}^2$ 、駆動周波数が1.5kHz以上、及びヘッドの温度が35～60℃の条件が好ましい。

【0026】本発明のインクを用いて染色を行うのに好適な装置の一例として、記録ヘッドの液室のインクに記録信号に対応した熱エネルギーを与え、該熱エネルギーより液滴を発生させる装置が挙げられるが、以下それについて説明する。

【0027】その装置の主要部分であるヘッド構成例を図1、図2及び図3に示す。

【0028】ヘッド13はインクを通す溝14を有するガラス、セラミックスまたはプラスチック板等と、乾熱記録に用いられる発熱ヘッド15（図ではヘッドが示されているが、これに限定されるものではない）とを接着して得られる。発熱ヘッド15は酸化シリコン等で形成される保護膜16、アルミニウム電極17-1、17-2、ニクロム等形成される発熱抵抗層18、蓄熱層19、アルミナ等の放熱のよい基板20よりなっている。

【0029】インク21は吐出オリフィス（微細孔）22まできており、圧力Pによりメニスカス23を形成している。

【0030】今、電極17-1、17-2に電気信号が加わると、発熱ヘッド15のnで示される境域が急激に発熱し、ここに接しているインク21に気泡が発生し、その圧力でメニスカス23が突出し、インク21が吐出し、オリフィス22より記録小滴24となり、布帛25に向かって飛翔する。図3には図1に示すヘッドを多数並べたマルチヘッドの外観図を示す。該マルチヘッドはマルチ溝26を有するガラス板27と、図1に説明したものと同様な発熱ヘッド28を密着して作製されている。なお、図1は、インク流路に沿ったヘッド13の断面図であり、図2は図1の2-2線での切断面である。

【0031】図4にかかるヘッドを組み込んだインクジェット記録装置の一例を示す。

【0032】図4において、61はワイピング部材としてのブレードであり、その一端はブレード保持部材によって保持されて固定端となり、カンチレバーの形態をなす。ブレード61は記録ヘッドによる記録領域に隣接した位置に配設され、また、本例の場合、記録ヘッドの移動経路中に突出した形態で保持される。62はキャップであり、ブレード61に隣接するホームポジションに配設され、記録ヘッドの移動方向と垂直な方向に移動して吐出口面と当接し、キャッピングを行う構成を備える。さらに63はブレード61に隣接して設けられている吸収体であり、ブレード61と同様、記録ヘッドの移動経路中に突出した形態で保持される。上記ブレード61、キャップ62、吸収体63によって吐出口面に水分、塵

埃等の除去が行われる。

【0033】65は吐出エネルギー発生手段を有し、吐出口を配した吐出口面に対向する布帛にインクを吐出して記録を行う記録ヘッド、66は記録ヘッド65を搭載して記録ヘッド65の移動を行うためのキャリッジである。キャリッジ66はガイド軸67と摺動可能に係合し、キャリッジ66の一部はモータ68によって駆動されるベルト69と接続（不図示）している。これによりキャリッジ66はガイド軸67に沿った移動が可能となり、記録ヘッド65による記録領域及びその隣接した領域の移動が可能となる。

【0034】51は布帛を挿入するための給布部、52は不図示のモータにより駆動される布送りローラである。これらの構成によって記録ヘッドの吐出口面と対向する位置へ布帛が給布され記録が進行するにつれて排布ローラ53を配した排布部へ排布される。

【0035】上記構成において記録ヘッド65が記録終了等でホームポジションに戻る際、ヘッド回復部64のキャップ62は記録ヘッド65の移動経路から退避しているが、ブレード61は移動経路中に突出している。この結果、記録ヘッド65の吐出口面がワイピングされる。なお、キャップ62が記録ヘッド65の吐出口面に当接してキャッピングを行う場合、キャップ62は記録ヘッドの移動経路中に突出するように移動する。

【0036】記録ヘッド65がホームポジションから記録開始位置へ移動する場合、キャップ62及びブレード61は上述したワイピング時の位置と同一の位置にある。この結果、この移動においても記録ヘッド65の吐出口面はワイピングされる。

【0037】上述の記録ヘッドのホームポジションへの移動は、記録終了時や吐出口回復時ばかりでなく、記録ヘッドが記録のための記録領域を移動する間に所定の間隔で記録領域に隣接したホームポジションへ移動し、この移動に伴って上記ワイピングが行われる。

【0038】図5は、ヘッドのインク供給部材、例えばチューブを介して供給されるインクを収容したインクカートリッジの一例を示す図である。ここで、40は供給用インクを収容したインク収容部、例えば、インク袋であり、その先端にはゴム製の栓42が設けられている。この栓42に針（不図示）を挿入することにより、インク袋40中のインクをヘッドに供給可能ならしめる。44は廃インクを受容する吸収体である。インク収容部としては、インクとの接液面がポリオレフィン、特にポリエチレンで形成されているものが好ましい。本発明で使用するインクジェット記録装置としては、上記の如きヘッドとインクカートリッジが別体になったものに限らず、図6に示すが如きそれらが一体になったものにも好適に用いられる。

【0039】図6において、70は記録ユニットであって、この中にはインクを収容したインク収容部、例えば

インク吸収体が収納されており、かかるインク吸収体中のインクが複数のオリフィスを有するヘッド部71からインク滴として吐出される構成になっている。72は記録ユニット内部を大気に連通させるための大気連通口である。この記録ユニット70は、図4で示す記録ヘッドに変えて用いられるものであって、キャリッジ66に対し着脱可能になっている。

#### 【0040】

【実施例】以下、本発明を実施例及び比較例によりさらに具体的に説明するが、本発明はこれらに限定されるものではない。なお、特に断わらない限り「部」は「重量部」を、「%」とは「重量%」をいう。評価結果は表1にまとめた。

#### 実施例1

パラフィンワックスの水性エマルジョンの作製：パラフィンワックス（分子量300～600）を30部、ポリオキシエチレンセチルエーテルを2部、ポリオキシエチレンソルビタンパルミチン酸エステルを1部、水を67部とを常法により乳化して、パラフィンワックスの水性エマルジョンとした。

【0041】ポリエチレンワックスの水性エマルジョンの作製：ポリエチレンワックス（分子量2000～3000）を30部、ポリオキシエチレンセチルエーテルを

#### イエローインク

・C. I. リアクティブイエロー95	8部
・チオジグリコール	20部
・ジエチレングリコール	15部
・イオン交換水	57部

#### マゼンタインク

・C. I. リアクティブレッド226	8部
・チオジグリコール	20部
・ジエチレングリコール	10部
・イオン交換水	62部

#### シアンインク

・C. I. リアクティブブルー15	10部
・チオジグリコール	20部
・ジエチレングリコール	15部
・イオン交換水	55部

#### ブラックインク

・C. I. リアクティブブラック39	11部
・チオジグリコール	20部
・ジエチレングリコール	15部
・イオン交換水	54部

プリント終了後、直ちに102℃で8分間スチーム処理を行い、次いで水洗、乾燥した。この結果、得られた綿布上には深みのある十分な濃度のカラー画像が鮮やかにプリントされていた。また、画像ムラもなく、シャープな画像が得られた。

#### 実施例2

実施例1に記載のパラフィンワックスの水性エマルジ

2部、ポリオキシエチレンソルビタンパルミチン酸エステルを1部、水を67部とを常法により乳化して、ポリエチレンワックスの水性エマルジョンとした。

【0042】上記パラフィンワックスの水性エマルジョンを3.0部、ポリエチレンワックスの水性エマルジョンを2.0部、ポリオキシエチレン（ $n=25$ ）ステアリルエーテルを15部、重炭酸ソーダを5.0部、水を75.0部を混合し、50℃に加温した状態で3時間攪拌混合し、溶液状の前処理剤を得た。この前処理剤を平織りの綿布に含浸させ（絞り率：100%）乾燥して、本実施例のインクジェット捺染用布帛を得た。なお、絞り率（%）は、下記の式で求めた。

【0043】絞り率（%）＝〔（前処理剤の付与重量）／（布の重量）〕×100

上記で得られた布帛をA4版の大きさに切り出し、市販のインクジェットカラープリンター（キヤノン製BJC-820、商品名）を用いて、以下に示す組成のインクを使用してフルカラープリントを行った。また、4種のインクは各々、各成分を混合攪拌後、水酸化ナトリウムでpH＝7.0に調整してからフロロポアフィルターで濾過して用いた。

#### 【0044】

ンを0.04部、ポリエチレンワックスの水性エマルジョンを0.02部、ポリオキシエチレン（ $n=25$ ）ステアリルエーテルを15.0部、重炭酸ソーダを5.0部、水を79.94部を混合し、50℃に加温した状態で3時間攪拌混合し、溶液状の前処理剤を得た。この前処理剤を平織りの綿布に含浸させ（絞り率：100%）乾燥して、本実施例のインクジェット捺染用布帛を得

た。

【0045】上記で得られた布帛をA4版の大きさに切り出し、市販のインクジェットカラープリンター（キヤノン製BJC-620、商品名）を用いて、実施例1に示す組成のインクを使用してフルカラープリントを行った。

【0046】プリント終了後、直ちに102℃で8分間スチーム処理を行い、次いで水洗、乾燥した。この結果、得られた綿布上には深みのある十分な濃度のカラー画像が鮮やかにプリントされていた。また、画像ムラもなく、シャープな画像が得られた。

#### 実施例3

実施例1に記載のパラフィンワックスの水性エマルジョンを32.0部、ポリエチレンワックスの水性エマルジョンを25.0部、ポリオキシエチレン（ $n=5.0$ ）セチルエーテルを15.0部、重炭酸ソーダを5.0部、水を23.0部を混合し、50℃に加温した状態で3時間攪拌混合し、溶液状の前処理剤を得た。この前処理剤を絹布に含浸させ（絞り率：100%）乾燥して、本実施例のインクジェット捺染用布帛を得た。

【0047】上記で得られた布帛をA4版の大きさに切り出し、市販のインクジェットカラープリンター（キヤノン製BJC-600、商品名）を用いて、実施例1に示す組成のインクを使用してフルカラープリントを行った。

【0048】プリント終了後、直ちに102℃で8分間スチーム処理を行い、次いで水洗、乾燥した。この結果、得られた絹布上には深みのある十分な濃度のカラー画像が鮮やかにプリントされていた。また、画像ムラもなく、シャープな画像が得られた。

#### 実施例4

実施例1に記載のパラフィンワックスの水性エマルジョンを2.5部、ポリエチレンワックスの水性エマルジョンを0.5部、ポリオキシエチレン（ $n=2.5$ ）ステアarylエーテルを12.0部、重炭酸ソーダを5.0部、水を80.0部を混合し、50℃に加温した状態で3時間攪拌混合し、溶液状の前処理剤を得た。この前処理剤を平織りの綿布に含浸させ（絞り率：100%）乾燥して、本実施例のインクジェット捺染用布帛を得た。

【0049】上記で得られた布帛をA4版の大きさに切り出し、市販のインクジェットカラープリンター（キヤノン製BJC-600、商品名）を用いて、実施例1に示す組成のインクを使用してフルカラープリントを行った。

【0050】プリント終了後、直ちに102℃で8分間スチーム処理を行い、次いで水洗、乾燥した。この結果、得られた綿布上には深みのある十分な濃度のカラー画像が鮮やかにプリントされていた。また、画像ムラもなく、シャープな画像が得られた。

#### 実施例5

実施例1に記載のパラフィンワックスの水性エマルジョンを1.0部、ポリエチレンワックスの水性エマルジョンを2.0部、ポリオキシエチレン（ $n=5.0$ ）セチルエーテルを5.0部、重炭酸ソーダを5.0部、水を87.0部を混合し、50℃に加温した状態で3時間攪拌混合し、溶液状の前処理剤を得た。この前処理剤を絹布に含浸させ（絞り率：100%）乾燥して、本実施例のインクジェット捺染用布帛を得た。

【0051】上記で得られた布帛をA4版の大きさに切り出し、市販のインクジェットカラープリンター（キヤノン製BJC-420、商品名）を用いて、実施例1に示す組成のインクを使用してフルカラープリントを行った。

【0052】プリント終了後、直ちに102℃で8分間スチーム処理を行い、次いで水洗、乾燥した。この結果、得られた絹布上には深みのある十分な濃度のカラー画像が鮮やかにプリントされていた。また、画像ムラもなく、シャープな画像が得られた。

#### 実施例6

実施例1に記載のパラフィンワックスの水性エマルジョンを3.0部、ポリエチレンワックスの水性エマルジョンを2.0部、ポリオキシエチレン（ $n=5.0$ ）ステアarylエーテルを1.0部、重炭酸ソーダを5.0部、水を89.0部を混合し、50℃に加温した状態で3時間攪拌混合し、溶液状の前処理剤を得た。この前処理剤を絹布に含浸させ（絞り率：100%）乾燥して、本実施例のインクジェット捺染用布帛を得た。

【0053】上記で得られた布帛をA4版の大きさに切り出し、市販のインクジェットカラープリンター（キヤノン製BJC-820、商品名）を用いて、実施例1に示す組成のインクを使用してフルカラープリントを行った。

【0054】プリント終了後、直ちに102℃で8分間スチーム処理を行い、次いで水洗、乾燥した。この結果、得られた絹布上には深みのある十分な濃度のカラー画像が鮮やかにプリントされていた。また、画像ムラもなく、シャープな画像が得られた。

#### 実施例7

実施例1に記載のパラフィンワックスの水性エマルジョンを3.0部、ポリエチレンワックスの水性エマルジョンを2.0部、ポリオキシエチレン（ $n=2.0$ ）セチルエーテルを18.0部、重炭酸ソーダを5.0部、水を72.0部を混合し、50℃に加温した状態で3時間攪拌混合し、溶液状の前処理剤を得た。この前処理剤を平織りの綿布に含浸させ（絞り率：100%）乾燥して、本実施例のインクジェット捺染用布帛を得た。

【0055】上記で得られた布帛をA4版の大きさに切り出し、市販のインクジェットカラープリンター（キヤノン製BJC-820、商品名）を用いて、実施例1に示す組成のインクを使用してフルカラープリントを行っ



た。

【0056】プリント終了後、直ちに102℃で8分間スチーム処理を行い、次いで水洗、乾燥した。この結果、得られた綿布上には深みのある十分な濃度のカラー画像が鮮やかにプリントされていた。また、画像ムラもなく、シャープな画像が得られた。

#### 比較例1

パラフィンワックスの水性エマルジョンとポリエチレンワックスの水性エマルジョンを用いない以外は実施例1と同様に、比較用の綿布を調整した。

【0057】この布帛に、市販のインクジェットカラープリンター（キヤノン製BJC-820、商品名）を用いて、実施例1に示す組成のインクを使用してフルカラープリントを行った。プリント終了後、実施例1と同様に処理して捺染物を得た。

【0058】この結果、得られた綿布上には滲みの少ないカラー画像が得られたが、実施例と比べ鮮明さに欠け、また、深みのある十分な濃度のカラー画像ではなかった。

#### 比較例2

パラフィンワックスの水性エマルジョンを用いない以外は実施例1と同様に、比較用の綿布を調整した。

【0059】この布帛に、市販のインクジェットカラープリンター（キヤノン製BJC-820、商品名）を用いて、実施例1に示す組成のインクを使用してフルカラープリントを行った。プリント終了後、実施例1と同様に処理して捺染物を得た。この結果、得られた綿布上には滲みの少ない比較的鮮やかな色調のカラー画像が得られたが、深みのある十分な濃度のカラー画像ではなく、実施例と比べ、特にベタ部にムラが見られた。

#### 比較例3

ポリエチレンワックスの水性エマルジョンを用いない以外は実施例1と同様に、比較用の綿布を調整した。

【0060】この布帛に、市販のインクジェットカラープリンター（キヤノン製BJC-820、商品名）を用いて、実施例1に示す組成のインクを使用してフルカラープリントを行った。プリント終了後、実施例1と同様に処理して捺染物を得た。この結果、得られた綿布上には滲みの少ない比較的鮮やかな色調のカラー画像が得られたが、深みのある十分な濃度のカラー画像ではなく、実施例と比べ、特にベタ部にムラが見られた。

#### 比較例4

パラフィンワックスの水性エマルジョンを20.0部、ポリエチレンワックスの水性エマルジョンを35.0部を用いた以外は実施例1と同様に、比較用の綿布を調整した。しかし、処理液の均一性が悪く、処理しなかった。

【0061】この布帛に、市販のインクジェットカラープリンター（キヤノン製BJC-820、商品名）を用いて、実施例1に示す組成のインクを使用してフルカラ

ープリントを行った。プリント終了後、実施例1と同様に処理して捺染物を得た。この結果、得られた綿布上には濃度、深み的にはよいカラー画像が得られたが、実施例と比べ、ベタ部にはムラが見られ、シャープさにも欠ける画像となった。

#### 比較例5

パラフィンワックスの水性エマルジョンを35.0部、ポリエチレンワックスの水性エマルジョンを10.0部を用いた以外は実施例1と同様に、比較用の綿布を調整した。しかし、処理液の均一性が悪く、処理しなかった。

【0062】この布帛に、市販のインクジェットカラープリンター（キヤノン製BJC-820、商品名）を用いて、実施例1に示す組成のインクを使用してフルカラープリントを行った。プリント終了後、実施例1と同様に処理して捺染物を得た。この結果、得られた綿布上には濃度、深み的にはよいカラー画像が得られたが、実施例と比べ、ベタ部にはムラが見られ、シャープさにも欠ける画像となった。

【0063】以上の実施例、比較例の評価結果を表1にまとめた。

【0064】

【表1】

		画像濃度	シャープ度	画像ムラ (ベタ部)
実施例	1	◎	◎	◎
	2	○	◎	○
	3	◎	○	◎
	4	◎	◎	◎
	5	◎	◎	◎
	6	◎	○	◎
	7	◎	◎	◎
比較例	1	×	○	△
	2	○	○	△～×
	3	○	○	×
	4	○	△	×
	5	○	△	×

(註) ◎：特に良好 ○：良好 △：問題あり ×：不可

【0065】

【発明の効果】以上説明したように、本発明によれば、インクジェット記録装置を利用して各種繊維からなる布帛上に画像を形成した場合に、鮮明でかつ深みがあり、ムラのない高濃度の画像を形成することが可能となる。

【0066】また、本発明によれば、オフィス用やパー

ソナル用として市販されている通常のインクジェットプリンターによっても、深みがあり、発色濃度が高くかつ鮮明な各種繊維からなる捺染物を容易に得ることができる。

【図面の簡単な説明】

【図1】本発明で使用するインクジェットヘッドの構成例を示すための、インク流路に沿った模式的断面図である。

【図2】図1の2-2線での切断面を示す。

【図3】図1に示すヘッドを多数並べたマルチヘッドの模式外観図である。

【図4】インクジェットヘッドを組み込んだ、本発明で使用するインクジェット記録装置の一例を示す斜視図である。

【図5】インクジェットヘッドに供給されるインクを収容したインクカートリッジの一例を示す断面図である。

【図6】ヘッドとインクカートリッジが一体となっているインクジェット記録装置の一例を示す斜視図である。

【符号の説明】

13 ヘッド

14 溝

15, 28 発熱ヘッド

16 保護膜

17-1, 17-2 アルミニウム電極

18 発熱抵抗体層

19 蓄熱層

20 基板

21 インク

22 吐出オリフィス

23 メニスカス

24 記録小滴

25 布帛

26 マルチ溝

27 ガラス板

40 インク袋

42 栓

44, 63 吸収体

51 給布部

52 布送りローラ

53 排布ローラ

61 ブレード

62 キャップ

64 回復部

65 記録ヘッド

66 キャリッジ

67 ガイド軸

68 モータ

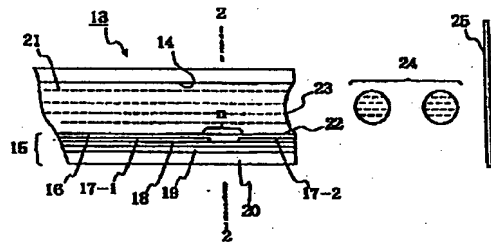
69 ベルト

70 記録ユニット

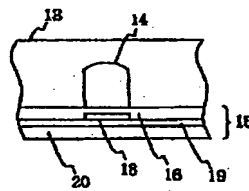
71 ヘッド部

72 大気連通口

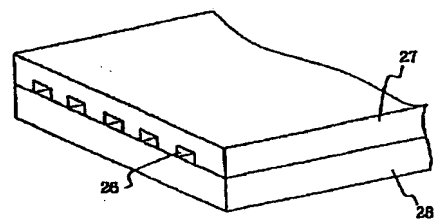
【図1】



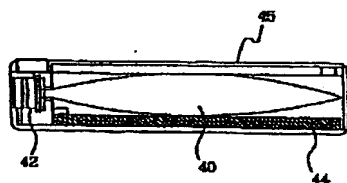
【図2】



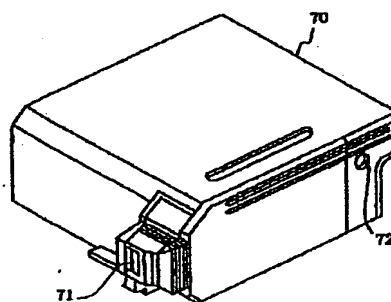
【図3】



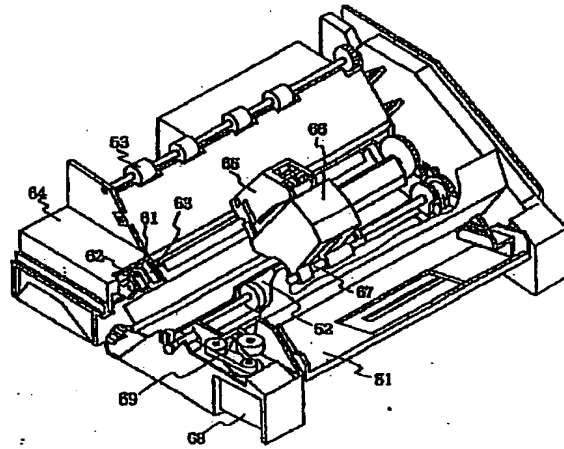
【図5】



【図6】



【図4】



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